68TH CONGRESS } SENATE { DOCUMENT
2d Session } { No. 178

WATERWAY FROM CHARLESTON, S. C., TO SAVANNAH, GA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

LETTER FROM THE CHIEF OF ENGINEERS, UNITED STATES ARMY WITH ACCOMPANYING REPORTS, RELATIVE TO A PRELIMINARY EXAMINATION AND SURVEY OF THE WATERWAY FROM CHARLESTON, S. C., TO SAVANNAH, GA.

JANUARY 2, 1925.—Presented by Mr. Jones of Washington, referred to the Committee on Commerce, and ordered to be printed

WAR DEPARTMENT,
Washington, December 3, 1924.

Hon. W. L. JONES,
Chairman Committee on Commerce,
United States Senate.

MY DEAR SENATOR: I am transmitting herewith a letter from the Chief of Engineers, United States Army, of the 1st instant, together with copy of a report dated July 15, 1924, by the Board of Engineers for Rivers and Harbors, and copy of a report dated December 13, 1923, by the district engineer, Charleston, S. C., on review of report on preliminary examination and survey of the waterway from Charleston, S. C. to Savannah, Ga., printed in House Document No. 627, Sixty-third Congress, second session, called for by a resolution of your committee.

Sincerely yours,

JOHN W. WEEKS,
Secretary of War.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 1, 1924.

Subject: Review of report on preliminary examination and survey of the waterway from Charleston, S. C., to Savannah, Ga.
To: The Secretary of War.

1. Referring to letter of the chairman of the Committee on Commerce, United States Senate, dated February 22, 1923, inclosing a copy of a resolution of the committee requesting the Board of Engineers for Rivers and Harbors to review its report submitted in House Document No. 627, Sixty-third Congress, second session, on preliminary examination and survey of the waterway from Charleston, S. C., to Savannah, Ga., I inclose herewith the report of the board in response thereto.

2. A protected passage is provided for small craft between Charleston and Savannah by a series of natural and improved waterways having a least depth of about 6 feet. On the stretch between Charleston and Beaufort, S. C., the only section now being improved by the United States is Wappoo Creek, with a project for a 6-foot channel 60 feet wide, the remainder of the route following existing rivers, creeks, and bays. Between Beaufort and Savannah the waterway is included in the project for the intracoastal route from Beaufort, S. C., to St. Johns River, Fla., which provides for a depth of 7 feet, with no specified width on this particular stretch. The mean range of tide is 5.2 feet at Charleston, 7 feet in Beaufort River, and 6.5 feet at Savannah.

3. The commerce moving over the waterway between Charleston and Beaufort in 1922 amounted to 26,000 tons and between Beaufort and Savannah to 73,000 tons. The tonnage for the section between Charleston and Beaufort is reported in 1923 as 77,000 tons, the most important items being vegetable food products, sand and gravel, fertilizer, and oysters. Facilities for transshipment between water and rail lines exist at Charleston, Yonges Island, Beaufort, Port Royal, and Savannah.

4. The report submitted to Congress in 1914, and published in House Document No. 627, Sixty-third Congress, second session, recommended work at specific points with a view to providing a channel 7 feet deep at mean low water and 75 to 100 feet wide between Charleston and Savannah, at an estimated cost of $100,000, including $10,000 for maintenance during construction. The project proposed has not received the approval of Congress. The section between Beaufort and Savannah has, however, since the date of that report been included in the project for the intracoastal waterway from Beaufort to St. Johns River, mentioned above.

5. In a report submitted December 13, 1923, the district engineer, who is also the division engineer, discusses possible changes in the route of the waterway, and recommends providing a cut-off between the Dawho and South Edisto Rivers. This route would shorten the waterway 9 miles, with an estimated saving in operating costs of vessels which he places at $12,000 annually. In addition to this cut-off, the district engineer considers it desirable, with a view to providing a through waterway 7 feet deep and 75 to 100 feet wide, that dredging be undertaken in Stono River, Church Flats, and Wappoo

Creek. The cost of the several items of work proposed is estimated as follows:

Stono River	$2,400
Church Flats	8,400
Wappoo Creek	10,000
Dawho to South Edisto River	80,000
Surveys and contingencies	9,200
Total	110,000

He recommends the adoption of a project for a waterway 7 feet deep at mean low water and 75 to 100 feet wide between Charleston and Beaufort and 7 feet deep and 100 feet wide between Beaufort and Savannah, at a total estimated cost of $110,000, with $10,000 annually for maintenance, provided local interests furnish, free of cost to the United States, all necessary rights of way.

6. The board considers that the route proposed is desirable and that work should be undertaken to the extent and in the manner recommended by the district engineer, except that a channel width of not less than 75 feet, with necessary widening at critical points, is believed adequate for the needs of commerce at this time. The adoption of a project channel of specified dimensions for the entire distance is considered particularly desirable. To avoid complication of the existing projects, the board recommends a project for a waterway from Charleston, S. C., to Beaufort, S. C., 7 feet deep at mean low water and not less than 75 feet wide, following in general the route proposed by the district engineer, at an estimated cost of $110,000, with $10,000 annually for maintenance, with local cooperation as recommended by the district engineer. It also recommends that the existing project for the intracoastal waterway from Beaufort, S. C., to St. Johns River, Fla., be modified so as to provide for a channel 7 feet deep at mean low water and not less than 75 feet wide in the section between Beaufort, S. C., and Savannah, Ga. These recommendations provide the same channels proposed by the district engineer, except as to width. No specific work is necessary, for which an estimate is required at this time, for the work below Beaufort, and the maintenance of this stretch will be covered by funds allotted for the waterway between Beaufort and St. Johns River.

7. After due consideration of the information presented, I concur in the views of the board.

Very truly yours,

H. TAYLOR,
Major General, Chief of Engineers.

WAR DEPARTMENT,
THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., July 15, 1924.

Subject: Inland Waterway, Charleston, S. C., to Savannah, Ga.
To: The Chief of Engineers, United States Army.

1. The board submits its report in response to the following resolution:

Resolved by the Committee on Commerce of the United States Senate, That the Board of Engineers for Rivers and Harbors, created under section 3 of the river and harbor act approved June 30, 1902, be, and is hereby, requested to review its report

submitted in House Document numbered 627, Sixty-third Congress, second session, on preliminary examination and survey of the waterway from Charleston, S. C., to Savannah, Ga.

2. By a system of natural and improved channels there exists a waterway, with a least depth of about 6 feet, from Charleston via Beaufort to Savannah. The improvements along this route have been made under various projects covering specific localities. At present the only section north of Beaufort, the improvement of which is being prosecuted, is Wappoo Cut, with a project for a 6-foot depth and a 60-foot width. The stretch from Beaufort south is part of the project for the intracoastal waterway from Beaufort to St. Johns River. This waterway has a project depth of 7 feet, but between Beaufort and Savannah has no project width. The mean tidal rise is 5.2 feet at Charleston, 7 feet in Beaufort River, and 6.5 feet at Savannah.

3. The commerce moving over the waterway amounted in 1922 to 73,000 tons between Savannah and Beaufort and 26,000 tons between Beaufort and Charleston. Recent reports give the 1923 commerce for the section between Beaufort and Charleston as 77,000 tons. The traffic was diversified, the most important items in order of tonnage being vegetable food products, sand and gravel, fertilizer, and oysters. The principal transshipping points in addition to Charleston and Savannah are the village of Yonges Island and the towns of Beaufort and Port Royal, which are respectively 25, 85, and 91 miles from Charleston. All of these have rail connections.

4. In the document under review, dated 1914, it was stated that additional work was needed to make the waterway more practicable and convenient for navigation. The recommendation was for the adoption of a project for a channel 7 feet deep at mean low tide and 75 to 100 feet wide between Charleston and Savannah. To provide this the district engineer recommended widening at Church Flats, and cut-offs between the Dawho and South Edisto Rivers and in Ramshorn Creek. The estimated cost was $100,000, including certain maintenance during construction. Congress has taken no action on this recommendation.

5. The district engineer, who is also the division engineer, favors the adoption of a single project, as previously proposed. He considers the following specific items of work desirable:

(*a*) Dredging to 7 feet at two points in Stono River, where there is insufficient depth over rock.

(*b*) Widening of the channel at Church Flats.

(*c*) A cut-off in Wappoo Creek, where a sharp bend just west of the drawbridge makes navigation difficult.

(*d*) Modification of the existing natural channel in the upper Dawho River section. The channel here has adequate width and depth, but navigation is made difficult by sharp bends. The district engineer gives consideration to a plan for eliminating the two worst of these by cuts through the marsh. He prefers, however, the complete elimination of this stretch by a cut-off across Little Edisto Island via North Creek, which would have the advantage of shortening the route by 9 miles, with resultant savings in operating costs of vessels, due to reduced mileage, estimated at $12,000 annually.

6. The district engineer also discusses a route, alternative to that at present used, which would render unnecessary the passage through St. Helena Sound, where rough water is sometimes encountered, but concludes that the cost, estimated at $157,000, would be excessive. His recommendation is for a channel 7 feet deep and from 75 to 100 feet wide, widened at bends, between Charleston and Beaufort, and 7 feet deep and 100 feet wide, widened at bends, between Beaufort and Savannah, to be attained by the work mentioned in paragraph 5, at a total estimated first cost, including surveys and contingencies, of $110,000 with $10,000 annually for maintenance, local interests to furnish necessary rights of way. The estimated cost of the several items of work proposed is as follows:

Stono River	$2,400
Church Flats	8,400
Wappoo Creek	10,000
Dawho River to South Edisto River	80,000
Surveys and contingencies	9,200
Total	110,000

7. On the system of waterways between Charleston and Beaufort the tonnage carried in 1923 was more than three times that recorded in 1922, while the passenger traffic increased to about 37,000. Details of the 1923 tonnage for the section between Beaufort and Savannah are not available, but the 1922 freight traffic was about 60 per cent greater than that during the previous year, and about 86,000 passengers were carried. The board believes that some changes in existing conditions are desirable to facilitate the handling of this business, and particularly that a project channel of specified dimensions should be adopted for the entire distance.

8. The document under review proposed a single project from Charleston to Savannah. Since its date, however, there has been adopted the consolidated Beaufort–St. Johns River project mentioned in paragraph 2. It is therefore preferable to maintain the integrity of the latter, with suitable changes as to dimensions, and to establish another project for the stretch Charleston–Beaufort. This will attain the same end as was contemplated in House Document No. 627, Sixty-third Congress, second session, and as is sought by the district engineer.

9. The board concurs with the district engineer as to the route proposed and as to the specific work to be undertaken at the present time. It considers, however, that adequate facilities will be provided by a channel width of not less than 75 feet, with necessary widening at critical points. It therefore recommends, in lieu of existing partial projects, a project for a waterway from Charleston to Beaufort, S. C., 7 feet deep at mean low tide and not less than 75 feet wide, following in general the route proposed by the district engineer, subject to such minor modifications of route as may later be deemed desirable by the Chief of Engineers, at an estimated cost of $110,000, with $10,000 annually for maintenance. The board further recommends that the existing project for the waterway from Beaufort, S. C., to St. Johns River, Fla., be modified so as to provide for a channel 7 feet deep at mean low water and not less than 75

feet wide in the section between Beaufort, S. C., and Savannah, Ga. No initial expenditure is involved in this latter recommendation, and maintenance of the stretch will be covered by funds for maintenance of the general project for the waterway between Beaufort and St. Johns River.

For the board:

EDGAR JADWIN,
Senior Member of the Board.

WAR DEPARTMENT,
UNITED STATES ENGINEER DEPARTMENT,
Charleston, S. C., December 13, 1923.

Subject: Review of survey and preliminary examination of inland waterway, Charleston, S. C., to Savannah, Ga., provided in House Document No. 627, Sixty-third Congress, second session.

To: The Chief of Engineers, United States Army, Washington, D. C., through the division engineer, southeast division, Charleston, S. C.

SYLLABUS

For the section from Beaufort, S. C., to Savannah, Ga., already covered by the existing project for the "Waterway between Beaufort, S. C., and the St. Johns River, Fla.," with a depth of 7 feet at low water, without specified width, a bottom width of 100 feet, increased to 150 feet at sharp bends, is recommended, the necessary work to be considered as maintenance. The district engineer considers the waterway from Charleston to Beaufort, S. C., worthy of further improvement by the United States and recommends a channel having a depth of 7 feet at mean low water and bottom widths from 75 feet in smaller streams to 100 feet in wide streams and bays. Estimated cost, $110,000 for new work and $10,000 for annual maintenance, needed right of way to be furnished free of cost to the United States. Plans call for partial improvement the first year at cost of $40,500 and completion later at cost of $69,500 additional.

1. In compliance with instructions contained in second indorsement by the Chief of Engineers on letter to the Secretary of War dated February 22, 1923 (E. D. 89413–15), transmitting request of the Committee on Commerce of the Senate for review of survey and preliminary examination of the waterway from Charleston, S. C., to Savannah, Ga., printed in House Document No. 627, Sixty-third Congress, second session, the following report is submitted:

2. The river and harbor act of March 4, 1913, directed a preliminary examination of the "Inland waterway from Charleston, S. C., to Savannah, Ga.," and also of the "Inland waterway from Beaufort, S. C., to Savannah, Ga." The district engineer made separate report upon these, but since the former waterway included the latter, his report on plan and estimate of cost of improvement was made for it only. The following review follows the same method:

3. *Location and general description.*—The waterway consists of a number of creeks, rivers, sounds, and bays, forming a route about 133 miles long from Charleston, S. C., to Savannah, Ga., sheltered in the main from rough waters. The village of Yonges Island and the towns of Beaufort and Port Royal, respectively, 25 miles, 85 miles, and 91 miles from Charleston, are the chief shipping points on the route. At Yonges Island (or Youngs Village), the Atlantic

Coast Line Railroad has a spur siding from which large shipments of truck are made, much of which is brought by boats from farms along the waterway or branches of it. Beaufort is a town of about 3,000 inhabitants and is on the Charleston & Western Carolina Railway, a subsidiary of the Atlantic Coast Line Railroad. It is in a productive truck section. Port Royal is the terminus of the Charleston & Western Carolina Railway. It has a population of about 300 and is near the United States marine barracks on Parris Island. Other shipping points are Martins Point, 2 miles south of Yonges Island, Fenwicks Island on Mosquito Creek near Ashepoo River and Bluffton, connecting with the waterway through Bulls Creek to Cooper River, about 20 miles from Savannah. Bluffton is about 11 miles by water from Cooper River. Fenwick Island has rail connection through a spur of the Seaboard Air Line Railway. Referring to the accompanying sketch, "Waterway between Charleston, S. C., and Savannah, Ga.," the waterway as outlined begins in Charleston Harbor at mouth of Ashley River and enters Wappoo Cut on west side of this river about 2 miles above its junction with Cooper River, passes through Elliotts Cut into Stono River and generally westward through Stono, Wadmelaw, and Dawho Rivers to South Edisto River; thence through Fenwicks Island Cut to Ashepoo River; through this river and part of the St. Helena Sound to Coosaw River; through Brickyard Creek to Beaufort River; through Archers Creek, Broad River, Skull Creek, Calibogue Sound, Cooper River, Ramshorn Creek, New, Wright, and Mud Rivers to Savannah River and Savannah. Small boats can go from Archers Creek through Rose Island Passage and down Chechessee Creek to Skull Creek, but this is a longer way; is not generally needed, and is not recommended. The deterioration of the channel in Archers Creek has for several years caused the chief traffic to go through Port Royal Sound into Skull Creek, but this route is much more exposed. It is therefore considered that while the alternate routes are available in this reach the official route is the one through Archers Creek, which was improved by the Government, and Broad River which is the shortest route and has reasonable protection. The cut across the horseshoe bend in Ramshorn Creek recommended in the original report under review and shown on the map[1] herewith, has since been authorized in connection with restoration of project depth in this stream.

4. *Previous examinations and improvements.*—No previous examinations of this waterway as a whole have been made, but different portions have been examined and improved, as follows:

(*a*) *Wappoo Creek.*—This has been improved to project depth of 6 feet and width of 60 feet, with the mouth in Ashley River increased to 7 feet and 200 feet width. Work has been done under the existing project which is the only project adopted by the river and harbor act of March 3, 1881.

(*b*) *Stono River, including Church Flats.*—No improvement work has been done. Some wrecks were removed in 1888, in 1913, and in 1920. Subsequent to the report under review examination was made of Church and Bohicket Creeks and Church Flats, the report of which is printed in House Document 1156, Sixty-fifth Congress, second session. The report was unfavorable for improvement of

[1] Not printed.

the creeks, but renewed recommendation for work at Church Flats contained in the report under review.

(*c*) *Fenwicks Island.*—Project approved June 13, 1902, for "Improving inland waterway between Charleston and Beaufort, S. C., with a view to a connection between the South Edisto and Ashepoo Rivers, at or near Fenwicks Island, in accordance with the report printed on pages 999, et seq., in the report of the Chief of Engineers for 1888, $30,000." Printed also in House Document 117, Fiftieth Congress, first session. The project was for 7 feet depth at mean low water and 90 feet bottom width. The work of improvement was done during 1905 and 1906.

(*d*) *Brickyard Creek or Beaufort River.*—The connection between Beaufort and Coosaw River is generally called Brickyard Creek, but appropriations were for Beaufort River. The project adopted in 1890 was for 7 feet depth and convenient width. Preliminary examination and survey is printed in Annual Report of Chief of Engineers of 1890, page 1235. Work was begun in 1891 and completed in 1905.

(*e*) *Archers Creek.*—Project adopted 1912, for 6 feet depth and 75 feet bottom width. Preliminary examination and survey printed in House Document 513, Sixty-second Congress, second session. Work of improvement done during 1913 and 1914.

(*f*) *Ramshorn Creek.*—This as a part of the improvement from Beaufort, S. C., to Savannah, Ga., was dredged to 7 feet depth. The project was completed in 1900. An examination was made in 1895, published in House Document No. 295 and in annual report of 1895, page 1521, for a steamboat channel 7 feet deep at mean low water between Beaufort, S. C., and Savannah, Ga. The report was favorable for route 2, which went down Wrights River along Dam No. 31 into Savannah River.

(*g*) An examination was made in 1888, report printed in annual report of 1889, page 1208, "to connect North Edisto and South Edisto Rivers by St. Pierre River and South Creek." The report was unfavorable.

(*h*) The report of the intracoastal waterway between Beaufort, N. C., and Key West, Fla., printed in House Document No. 229, Sixty-third Congress, first session, gives plans and estimates for a route that follows in general the route recommended in the report under review, but no appropriation was made.

5. *Commerce.*—The freight and passenger steamer *Hildegarde* makes one round trip between Charleston and Beaufort and one between Charleston and Edisto Island each week. The Stevens Line operates one weekly boat between Charleston and the landings on the waterway sometimes as far as Beaufort. It makes connection at Yonges Island with the Atlantic Coast Line Railroad and on Mosquito Creek with the Fenwicks Island spur track of the Seaboard Air Line Railway. Other boats handle freight to and from rail points along the waterway, reaching Charleston and Beaufort irregularly. Considerable freight between the Southern Railway terminus at Charleston and points on the waterway is handled by a line of small boats. The above report does not include a number of boats owned by farmers, by which they handle a portion of their business.

(A) COMMERCIAL STATISTICS

Charleston to Beaufort, S. C.

Year	Tons	Value	Passengers
1918	38,868	$2,282,601	29,802
1919	7,951	972,072	18,740
1920	9,304	455,754	16,324
1921	20,683	762,792	10,559
1922	26,025	908,536	10,275

The commerce has consisted chiefly of fertilizer and farm products with some sand, gravel, and lumber, the latter on the decrease. The small amounts for 1919 and 1920 are due not only to smaller shipments but also to failure to secure full reports from small craft, which are sufficiently numerous to handle considerable traffic. The statistics compiled for Wappoo Cut do not include traffic for rail shipment at Yonges Island, nor that reaching Beaufort from points along the waterway; nor shipments from Fenwicks Island section by rail over the Seaboard Air Line Railway. This railway has a spur track to Mosquito Creek, which empties into Ashepoo River about 3 miles above Fenwicks Island Cut.

Beaufort, S. C., to Savannah, Ga.

Years	Tons	Value	Passengers
1921	45,156	$2,169,350	100,177
1922	72,962	2,630,500	86,496

The chief tonnage was from oyster shells, oysters, fish, and sand, but in value the chief commodities were in 1921, groceries, arms and ammunition, canned goods, and general merchandise, and in 1922, arms and ammunition, groceries, miscellaneous, and canned goods, in the order named.

(B) PROBABLE TRAFFIC AFFECTED BY THE IMPROVEMENT

During the current year the following partial reports of freight movement have been received for the portion of the waterway between Charleston and Beaufort, S. C.:

Carriers	Period	Tons	Value	Passengers
Steamer Hildegarde, freight and passenger boat.	January to October 1	2,978	$484,736	9,326
Stevens Line, sundry motor boats	do	14,756	2,115,685	2,888
McCabe's boats	January to November 30.	16,567	1,333,199	
C. O. Elliott, motor boats	January to July 1	2,750	13,750	
Total		37,051	3,947,370	12,214

Upon this showing the total the above boats should handle during the current year is estimated as follows:

Tons	47,093
Value	$5,131,527
Passengers	16,284

Farm products and canned goods are the largest items both in tonnage and in value.

(c) SAVING IN COST OF TRAFFIC

The following table gives estimated cost of operation per mile of the different classes of boats using the waterway, the estimated number that will use it during the current calendar year, the total saving per mile, and for the 9 miles by which the proposed improvement between Dawho River and Edisto River would shorten the distance:

Boats through Dawho River, S. C.

Boats	Year 1923, estimated passages	Estimated operating cost per mile		Distance saved	Total operating cost for 9 miles
		Rate	Amount		
		Cents		*Miles*	
Steamboats	654	50	$327.00	9	
Tugs	172	40	68.80	9	
Large motors	619	25	154.75	9	
Small motors	2,235	15	335.25	9	
Pleasure craft	1,800	25	450.00	9	
Total	5,480		1,335.80	9	$12,022.20

There will also be savings due to quicker deliveries and probable increase in number of trips where the haul is short.

6. *Navigation.*—The route is tidal throughout. The usual tidal rise is 5.2 feet at Charleston, 7 feet in Beaufort River, and 6.5 feet at Savannah. The controlling project depth over the route including Archers Creek is 6 feet at low, 8.6 feet at mean, and 11.2 feet at usual high water, but these depths are not available at Church Flats over the whole of the proposed width of channel, and Archers Creek has shoaled at the eastern end to 2.5 feet at mean low water. There are five bridges on the route, all draw bridges, and the least available width of channel at these bridges is 60 feet. The channel of approach at the northern end of the route has depth of 20 feet and the southern end of 25 feet.

7. *Terminal and transfer facilities.*—The wharves are adequate for present and prospective traffic for some time.

8. *Water power.*—No water-power development is practicable,

9. *Work of improvement under consideration.*—The channel is in the main satisfactory except at two points in Stono River, at Church Flats, and the upper end of Dawho River, with also some difficulty due to a sharp bend near the bridge over Wappoo Creek. These details are as follows:

(*a*) *Stono River and Church Flats.*—At two localities in Stono River there are shoals of hard material with some phosphate rock at an elevation of 6 feet below mean low water. These at times of very low

tides give trouble to boats of 6 feet draft and over. The cost of removal is small in comparison with the possible damage to traffic.

(*b*) *Church Flats.*—The work needed here is to widen the channel for approximately 1,800 feet in length so as to afford a safe channel of 7 feet depth and 100 feet width over this stretch where the controlling depth for the proposed width is only 5 feet.

(*c*) *Cut between Dawho River and South Edisto River.*—(1) Shortening the distance by about 9 miles.

(2) Elimination of a very crooked and narrow part of Dawho River. In the upper portion of Dawho River boats have to move with caution at the sharp bends to avoid collision with other boats and with rafts. The reduction in mileage does not therefore represent the full saving in time.

(*d*) *Estimated work and cost of above items:*

Stono River, 6,000 cubic yards soft rock and mud, at 40 cents	$2,400
Church Flats, 21,000 cubic yards, hard material and some soft rock, at 40 cents	8,400
Dawho River to South Edisto River, 400,000 cubic yards mud and sand, at 20 cents	80,000
Surveys and contingencies	9,200
Total	100,000

(*e*) The annual saving in operation cost for boats now using the waterway is estimated at $12,022.20, which at the rate of 5 per cent represents interest on $240,444. This saving as a sinking fund at 5 per cent compounded annually would in six years pay the estimated cost ($100,000) of this shortening. Five per cent interest on the estimated cost is $5,000 per year, less than one-half the annual saving in operation costs of boats now in service. For shippers of truck from adjacent farms a saving of 18 miles per trip may reasonably be expected to increase volume of traffic.

(*f*) *Wappoo Creek.*—Cut to afford safe approach to bridge. This cut will shorten the distance about one-third mile and eliminate a dangerous curve just south of the highway bridge which now carries a large number of vehicles and will have an increasing volume as soon as certain developments now under way have been completed. The cut will be of value to navigation although its urgency is not considered so great as the items for Stono and Dawho Rivers and Church Flats.

Estimate: 50,000 cubic yards mud and sand, at 20 cents, $10,000.

(*g*) Maintenance of the waterway from Charleston, S. C., to Beaufort, S. C., is estimated at $10,000 annually.

(*h*) A route was examined from Ashepoo River across Hutchinson Island into Rock Creek and thence across Beet Island into Coosaw River. This would eliminate the passage through St. Helena Sound, which is sometimes rough and dangerous to small boats and would save about 3 miles in distance, but it is not so pressing as the other items and is not recommended at this time. Its cost is estimated at $157,000.

(*i*) Recent investigation shows that the proposed project dimensions exist over the route from Beaufort, S. C., to Savannah, Ga., except at portions of Archers Creek and of Ramshorn Creek. Archers Creek was dredged under the 6-foot project with its overdepth to a

general depth of not less than 7 feet. Since it now has a 7-foot channel, except where shoaling has occurred because of meeting currents, the required dredging is considered maintenance work. In Ramshorn Creek the shoaling has narrowed the 7-foot channel. The Savannah district contemplates maintenance work on this stream, including a cut-off, during the current fiscal year.

(*j*) In order to provide most promptly at a minimum initial cost a channel which will save traffic much time and expense, consideration has been given to doing the needed work in two installments, as follows:

(1) Dredging a channel of 7-foot depth and 60-foot bottom width through Walls Cut and the small approach cuts, and removal of shoals in Stono River. This does not include the cut across the point of Little Edisto Island on North Creek, the widening at Church Flats, nor the cut on Wappoo Creek. The estimated cost is:

North Creek and Walls Cut, 170,000 cubic yards mud and sand, at 20 cents	$34,000
Stono River, as in (*d*) (1)	2,400
Surveys and contingencies	4,100
Total	40,500

(2) Completion of improvement by widening the channel at Church Flats, Walls Cut, and approaches to 75-foot bottom width and the elimination of the bends at Little Edisto Island in North Creek and in Wappoo Creek near the bridge. The estimated cost of these items is:

Church Flats, as in (*d*) (2)	$8,400
North Creek and Walls Cut, widening 140,000 cubic yards mud and sand, at 20 cents	28,000
Little Edisto Island Cut, 90,000 cubic yards mud and sand, at 20 cents	18,000
Wappoo Creek, as in (*e*)	10,000
Surveys and contingencies	5,100
Total	69,500

(*k*) For an alternative to the cut-off between the Dawho and South Edisto Rivers, following in general the present curves of these rivers.

A survey has been made of the present route through upper Dawho River and the shoaled portion of South Edisto River near it, and these portions of the two rivers are shown on map[1] sent herewith. No dredging is required to obtain the proposed project dimensions, namely, 7 feet depth and 75 to 100 feet width, over the present route through these rivers. The channel in the Dawho River has so many bends that adequate rectification would cost as much as the proposed Walls Cut without a corresponding advantage in shortening the distance. Minor rectification by means of two cuts, shown on the map[1] at C–D and at E–F by broken and dotted lines, thus ——. .—— . .——, would eliminate three bends and save about 1½ miles in distance. The two cuts total 3,000 feet in length, and the estimated cost is as follows:

165,000 cubic yards mud and sand, at 20 cents	$33,000
Surveys and contingencies	3,500
Total	36,500

[1] Not printed.

Maintenance of these cuts is estimated at $1,000 for the first year, $500 per year for the second and third years, with probably no further need. Because the cost of this rectification is nearly as great as that of the North Creek-Walls Cut route, with only one-sixth the saving in distance, namely, 1½ against 9 miles, and because it is not probable that it would form part of future improvement of the route, it is not included in the recommendation for improvement.

10. *Cooperation.*—Cooperation by local interests is involved to the extent of furnishing free of cost to the United States right of way for deposit of dredged material and for widening North Creek and making cuts to Edisto River and for cut across bend in Wappoo Creek, the right of way to extend 150 feet on each side of the center line of the channel. There are no other questions of land reclamation, of flood protection, nor other special interests which would involve further cooperation.

11. *Recommendation.*—The district engineer after examination of present conditions concurs with the recommendation made in 1914 by the Chief of Engineers (H. Doc. No. 627, 63d Cong., 2d sess.) that further improvement by the United States of this waterway is advisable so far as to secure from Charleston, S. C., to Beaufort, S. C., an available channel depth of 7 feet and channel widths of 75 feet in the smaller streams and 100 feet in wide streams and bays, increased at entrances and on curves. He recommends the adoption of a project "Waterway between Charleston, S. C., and Beaufort, S. C.," as stated above, superseding the present partial project for Wappoo Cut. For the portion of the waterway south of Beaufort, S. C., the district engineer recommends that the existing project for 7 feet depth be modified to specify a bottom width of 100 feet increased to 150 feet at sharp bends. It is further recommended that appropriations be made as follows for the waterway between Charleston, S. C., and Beaufort, S. C.:

(A) For the first year $40,500 for the work outlined above in paragraph 9, item (*j*) (1) to provide a channel with depth of 7 feet and bottom width of 60 feet through North Creek and Walls Cut and the removal of two shoals in Stono River.

(B) For the second year $69,500 to complete the improvement by providing a channel with depth of 7 feet and bottom width of 75 feet between Charleston, S. C., and Beaufort, S. C., as described in full in paragraph 9 and in item (*j*) (2).

Annual maintenance is estimated at $10,000.

EDGAR JADWIN,
District Engineer.

[First indorsement]

OFFICE DIVISION ENGINEER,
SOUTHEAST DIVISION,
Charleston, S. C., December 18, 1923.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C.:

1. The recommendation of the district engineer in paragraph 11 above is concurred in.

EDGAR JADWIN,
Division Engineer.

[Third indorsement]

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., January 8, 1924.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. It is not clear to the board whether the dredging recommended by the district engineer at the three specific points in question will produce a through waterway 7 feet deep between Charleston and Savannah. Specifically it is noted that the present project depth for Wappoo Cut is 6 feet, and that apparently the deepening of the entire cut to 7 feet is not included in the recommendations. It seems desirable also that the district engineer should make recommendation as to the width of channel considered advisable between Beaufort and Savannah, as apparently the depth only is specified in the existing project.

2. The board therefore recommends that the report be returned to the district engineer for a full investigation, including if necessary a survey, with a view to ascertaining what work is necessary over the entire route from Charleston to Savannah to provide a channel having a least depth of 7 feet and suitable specified width. It further recommends that, as an alternative to the rather expensive cutoff proposed between the Dawho and South Edisto Rivers, the district engineer prepare an estimate for a route of the desired dimensions following in general the present course of these rivers; the work involved being any dredging found necessary in the natural waterways to attain project dimensions, together with minor rectifications of the channel if in the opinion of the district engineer such are advisable.

For the board:

H. TAYLOR,
Senior Member of the Board.

[Fourth indorsement]

OFFICE CHIEF OF ENGINEERS,
January 17, 1924.

To the DISTRICT ENGINEER,
United States Engineer Office, Charleston, S. C.:

For further investigation as recommended in the preceding indorsement.

By order of the Chief of Engineers:

H. TAYLOR,
Assistant Chief of Engineers.

To be returned through the division engineer, southeast division.

[Fifth indorsement]

UNITED STATES ENGINEER OFFICE,
Charleston, S. C., March 24, 1924.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C.

(Through the division engineer, southeast division, Charleston, S. C.)

1. The report, modified to conform to requirements of the third indorsement, is returned herewith.

2. The dredging recommended by the report will produce a through waterway 7 feet deep and 75 feet wide increased to 100 feet wide in wide streams and bays and at sharp bends, between Charleston and Beaufort, S. C. The channel through Wappoo Cut except at the Ashley entrance is now 7 feet deep and 75 feet wide, and hence does not require further work for the proposed project dimensions. The Ashley River entrance, for which the project depth is 7 feet, has the required depth but needs some widening. This can be done with maintenance funds in hand.

3. The report as modified includes the recommendation that the channel width between Beaufort, S. C., and Savannah, Ga., be 100 feet, increased to 150 feet at sharp bends. This is the project width of the section from Fernandina, Fla., to the St. Johns River, Fla.

4. Recent investigation shows that the proposed project dimensions exist over the route from Beaufort, S. C. to Savannah, Ga., except at limited portions of Archers Creek and of Ramshorn Creek. The eastern end of Archers Creek has shoaled to a controlling depth of 2 feet at mean low water for a width of 50 feet and 1 foot for 100 feet width. There are also a few small shoals near the middle of this creek. The amount of dredging required to remove the shoals is estimated at 33,000 cubic yards, which includes an entrance width of 150 feet for 200 feet. Archers Creek was dredged under the 6-foot project with its overdepth to a general depth of 7 feet or more. Since it now has a 7-foot channel except where shoaling has occurred because of meeting currents, the required dredging is considered maintenance work. In Ramshorn Creek the shoaling has narrowed the 7-foot channel. The Savannah district contemplates maintenance work on this stream, including a cut-off, during the current fiscal year to restore the project width and depth.

5. The present route through upper Dawho River and the shoaled portion of South Edisto River near it have been surveyed, and these portions of the two rivers are shown on map[1] sent herewith. The proposed project dimensions, namely, 7-foot depth and 75 to 100 feet width, exist over the present route. The channel in Dawho River has so many bends that adequate rectification would cost as much as the proposed Walls Cut without corresponding advantage in shortening the distance. The center line of a moderate rectification of the river, shown on the map[1] at c–d and at e–f by broken and dotted lines, thus, —— ... —— .. —— ... would require cuts totaling 3,000 feet in length. The estimated cost of these cuts is $36,500, and the distance saved is about 1½ miles. Some maintenance cost would doubtless be added for the first few years. The estimated total cost of the Walls Cut route is about two and four-tenths times that of this

[1] Not printed.

rectification for the same width, but the distance saved is six times that of the rectification, with the advantages of a route free from the bends of the Dawho River. Future rectification could not even at large cost equal the saving in distance effected by the North Creek-Walls Cut route. For these reasons no improvement of the upper Dawho route is recommended.

6. The revised report herewith contemplates the execution of the project in two installments. The first omits for the present the cut across a point of Little Edisto Island on North Creek and makes the preliminary dredged channel 60 feet wide at bottom instead of full width of 75 feet, retaining the 7-foot depth. This reduces the yardage estimate to 170,000 cubic yards, and the cost from about $88,000 to $37,500. For safety in navigation the removal of the rock in Stono River is included, making a total of $40,500 for the first installment to meet the most urgent need. For the second installment the estimated total cost is $69,500 to complete the proposed improvement. Maintenance for the route from Charleston to Beaufort, S. C., is estimated at $10,000 per year.

7. The following sheets are sent for the revision of the report:

Sheets 1 and 1a to replace page 1 of original report.

Sheets 5, 6, 7, and 8 to replace pages 5, 6, and 7 of original report.

EDGAR JADWIN,
Colonel, Corps of Engineers.

[Sixth indorsement]

OFFICE DIVISION ENGINEER,
SOUTHEAST DIVISION,
Charleston, S. C., March 26, 1924.

To the CHIEF OF ENGINEERS, U. S. ARMY,
Washington, D. C.:

The recommendations of the district engineer in the revised report are concurred in.

EDGAR JADWIN,
Division Engineer.

O